



# Car-Battery Welding

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## TOOLS:

- [Gloves \(1\)](#)
- [Hammer \(1\)](#)
- [Pliers \(1\)](#)
- [Welding Electrodes \(1\)](#)  
*Standard amount is a 5 pound box, but a handful will do*
- [Welding hood \(1\)](#)
- [car batteries \(3\)](#)
- [jumper cables \(2\)](#)

## PARTS:

- [scrap steel \(1\)](#)

## SUMMARY

Welding! Welding is a glorious, mystery-infused, thoroughly bad-ass way to stick things together. Welders move in their own cloud of mythos and danger - they are dirtier, tougher, and sexier than other kinds of makers, and the things they build are big and strong and hold our world together. Want to be a welder but have no money and less experience? This guide will help.

## Step 1 — Car-Battery Welding



- Gather materials. Some of the things you need to buy, most of them you prob either have lying around or can borrow.
- Gloves. Welding gloves would be nice, but any heavy, non-flammable gloves will do.
- Jumper cables. You will need at least a couple of sets, or one set and some heavy-gauge wire to wire the batteries together. How heavy? Like, as thick as a jumper cable.
- Welding helmet. Cute little steampunk-y goggles will not cut it. Arc welding dumps out a ton of UV. All exposed skin will get a deep, horrific sunburn. A cheap welding helmet will work almost as well as a fancy one.
- Three car batteries. Smaller batteries (like ATV, golf cart, motorcycle) will work as well. What you need is a total of 30-36 volts. The more amp hours (usually, the larger the battery, the higher the hours), the longer you will be able to weld.
- Hammer. For chipping slag- a welding chip hammer is best, but a normal claw hammer will work. A rock works, too.
- Steel to weld. If it rusts, it's steel.
- Welding electrodes, or rods.

Steel rods, covered in flux. To make your own would be hardcore DIY and a waste of time. You can buy welding rods anywhere in the world. Get a box of 6010 or 6011 1/8 inch electrodes. 5 pounds will set you back \$20, max. You can also beg a handful off of any welding shop. The number code refers to the strength of the electrode, the chemical composition of the flux, and the positions you can weld in. Interesting stuff, but kind of beyond the purview of this. For more info go [here](#).

## Step 2



- The batteries need to be wired in series: First wire the positive of one to the negative of the next.

## Step 3



- And then, positive to negative again...

## Step 4



- Open positive gets clamped to the work. This is your ground clamp.

## Step 5



- Now you need an electrode holder. You will eventually want to buy one (I have seen them as cheap as \$5 on Amazon) but with a little bending of the jumper cable clamp and a little scraping of the flux on the rod, you can make it fit.
- The key here is to make sure the electrode is secure in the clip and that there is as much surface contact as possible. A high-amp current is going through this connection, so make sure it is a good one.

## Step 6



- OK. It's time to connect the final lead. Grab the cable that is holding the electrode. Connect the other end to the lonely, bare battery terminal. It should be negative. If it is not, check your wiring!
- YOUR WELDER IS NOW HOT ("HOT" in the electrical way. Kind of sexy, too.) BE CAREFUL WHERE YOU PUT THE ELECTRODE. Make sure the electrode is not touching the ground cable, or anything that is conducting to the ground cable, like the work, a metal welding table, salt water aquarium, etc. Put it somewhere safe.



## Step 7



- Get things safe: secure your work area. Arc welding can shoot out a lot of really hot sparks, so you want to cover the batteries with something non-flammable. I used a leather apron. A jacket, welding blanket, sheets of plywood, or a coffee table will work as well.



## Step 8



- Set up your metal for your first weld. You can use clamps or a vise. The important thing is that all parts you want to weld together are conducting to one another and to the ground clamp.
- Remember to gear up: Wear gloves, rated welding helmet, non-flammable clothing. Make sure ALL exposed skin is covered.

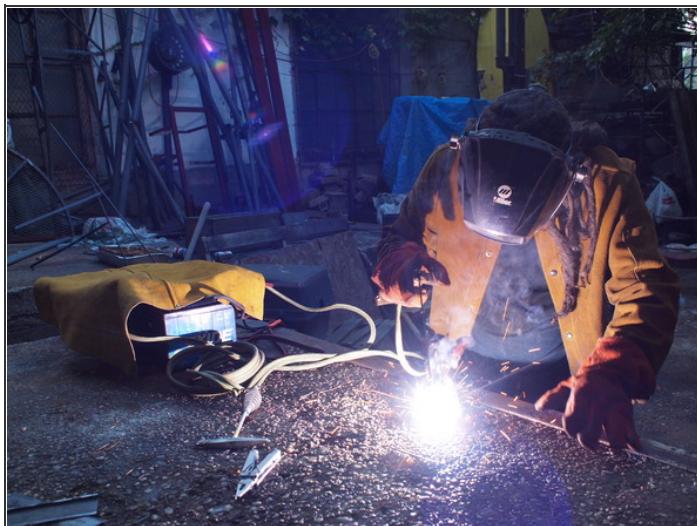


## Step 9



- Ready? Ready? Time to strike an arc. Hold the electrode holder/electrode in your dominant hand, in a way that is secure and comfortable. Play around a little until you find a grip that seems like it will work. You want control and a firm grip.
- Strike an arc, like you would strike a match. Sweep the tip of the electrode against the work firmly, in a short arc. Like a match, it should flare up. Like a match, it could take multiple tries.
- When you do strike your first arc it can scare the @!%% out of you. Your first impulse will be to get away from the hot sparking thing. With practice, you can crush that impulse into a little ball.
- After you strike the arc, practice until you can get the tip of the electrode to stop about an eighth of an inch from the work. The arc should be maintained, melting the electrode and the metal beneath it.
- Arc struck, hover for a moment where you want to start your weld. You should see a puddle of molten metal at the focus of the arc. This will be your first tack weld.

## Step 10



- Do the same again at the other end of the weld.
- Welding dumps a whole lot of heat into the metal. Metals expand when heated. If you align a couple of pieces of metal perfectly and do not secure them, they will have spread a considerable distance after a little bit of welding.
- These little welds, or "tacks," will hold the metal together as you weld. In general, you should put in a tack at the beginning and end of where you will be running a weld, and every six inches or so in between. This varies, of course, depending on the material thickness, heat of weld, and a whole lot of other things that experience and good references will teach you. Do not worry about that now.

## Step 11



- Your tacks will be covered with a weird, glassy substance. This is slag. As the electrode is heated, the flux on the outside of the rod boils away, spewing out a shielding gas that pushes away air, saving the hot metal from oxidation. (Otherwise, the weld would be a spongy, porous wad of speed rust.) In addition, the slag forms a protective layer over the weld. You need to clean the slag off to see your weld.
- Whack at the slag with a hammer. It is brittle stuff, so even a glancing blow will break it off.
- Any hammer or hammer-like thing will do, but a welding chip hammer is the right tool for this job.
- Be careful - little chips of hot slag in your eye is about as pleasant as it sounds.



## Step 12



- One problem with car-battery welding is that there is no way to control the amperage. If your rods are too thin, they will basically evaporate and you will get a shallow, crappy weld.
- A quick and dirty way to solve this is to use a thicker rod (that's what she said). If you do not have thicker rods, make one by wiring two rods together. Baling wire works. A little bit of bare copper wire works better.

## Step 13



- Another option is to use one rod to melt the metal, and another to fill the puddle. This is not a beginner move, but will work well after you have some experience.
- Just whack another rod with a hammer to get most of the flux off. Weld with one hand, fill with the other. This method works well when you are welding thinner metals that you would otherwise burn through.

## Step 14



- Oh crap! My electrode's stuck! This happens all the time when you are learning to arc weld. The electrode sticks, and if you cannot pop it free, it completes the circuit without throwing an arc.
- The heat is still there, and the electrode gets red hot. The flux will probably burst into flames.
- If/when this happens, break the circuit by releasing the electrode from the clamp. When it cools a little, pop it off with pliers or a hammer. Toss the electrode, or use it as filler rod.

## Step 15



- If things seem to be working, strike an arc, then make a puddle of molten metal. Push the rod in a little to fill the melt pool, then move forward a little (like half the diameter of the weld pool) and repeat. Imagine that you are making a red-hot stack of dimes.
- You are welding! This is the weld I got with this rig. It is not pretty, but it is solid. Play around with it as much as you can - speed, hand position, depth of penetration. The mechanics of welding are pretty easy, but like anything worthwhile, getting good takes time and practice.

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Photography by Becky Stern.

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